

REMARKS

Claims 1-32, 41-48, 63-86, 88, and 91 are pending in the present application. Claims 1-32, 37-39, 41-61, 63-88, and 91-97 were presented for examination. Claims 37-39, 49-61, 87, and 92-97 have been cancelled by amendment.

In the office action mailed January 13, 2005 (the "Office Action"), claims 1-28, 37-39, 41-56, 59-61, 63, 64, 67-71, 76, 78, 80, 82, 84, 86-88, 91-97 were rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,731,301 to Sato *et al.* (the "Sato patent"). Claims 29-32 were rejected under 35 U.S.C. 103(a) as being unpatentable over the Sato patent in view of U.S. Patent No. 6,501,483 to Wong *et al.* (the "Wong patent"). Claims 57, 58, 65, 66, 72-75, 77, 79, 81, 83, and 85 were rejected under 35 U.S.C. 103(a) as being unpatentable over the Sato patent in view of Don P. Mitchell, "Generating Antialiased Images at Low Sampling Densities," Computer Graphics, Vol. 21, No. 4, July 1987, pp. 65-72 ("the Mitchell reference")

As previously mentioned, claims 37-39, 49-61, 87, and 92-97 have been cancelled by amendment. Consequently, the Examiner's rejection of these claims is now moot.

The Examiner has rejected independent claims 1, 14, 23, 27, 41, 42, 63, 64, 70, 86, and 91 under 35 U.S.C. 102(e) as being anticipated by the Sato patent. The effective 102(e) date of the Sato patent is the U.S. filing date of March 26, 2001. Note that the March 26, 2001 effective 102(e) date is only four days earlier than the filing date of the present application. Although a declaration by the inventors swearing behind the Sato reference has not been submitted with this response, such a declaration could likely be made and submitted to remove the Sato patent as a prior art reference. However, at this time, upon review of the Sato patent and the pending claims, the use of a declaration swearing behind the Sato patent is unnecessary because claims 1, 14, 23, 27, 41, 42, 63, 64, 70, 86, and 91 are patentably distinct from the Sato patent. As will be discussed in greater detail below, the Sato patent fails to disclose the combination of limitations recited by the respective claims.

For example, with respect to claim 1, the Sato patent fails to at least disclose a method for calculating values for pixels of an image comprising calculating a pair of sample values for pixels of an image in accordance with a sampling pattern for each pixel, the sampling pattern for consecutive pixels alternating between a first and a second sampling pattern, each

sampling pattern defining one or more sampling locations at which sample values are calculated, the sampling locations being relative to a pixel. The Sato patent discloses various sampling patterns where a pixel is divided into a four-by-four matrix of potential sample locations, and each sampling pattern per pixel includes four or more samples. In contrast, claim 1 recites calculating a pair of sample values per pixel.

With respect to claim 14, the Sato patent fails to at least disclose a method for generating an image having pixels arranged in rows and columns parallel to first and second perpendicular axes, respectively, the method comprising calculating pairs of sample values for pixels of the image in accordance with a plurality of sampling patterns, one sampling pattern per pixel, one pair of sampling points per sampling pattern. As previously discussed with respect to claim 1, the Sato patent does not describe sampling patterns where only a pair of sample values are calculated for a pixel.

Claim 23 is patentably distinct from the Sato patent because the Sato patent fails to at least disclose a method for calculating values for pixels of an image having the pixels arranged in rows and columns parallel to first and second perpendicular axes, respectively, the method comprising calculating sample values for pixels of the image in accordance with a plurality of sampling rates, the sampling rate differing for at least two pixels of the image. The Sato patent discloses using different sampling patterns for different pixels, however, each sampling pattern has four samples per pixel. That is, the sampling rate for the pixels are the same, that is, four samples per pixel. Thus, although different sampling patterns are used, the sampling rate disclosed in the Sato patent does not change.

Similarly, claim 27 is patentable because the Sato patent fails to at least disclose a method for calculating values for pixels of an image having the pixels arranged in rows and columns parallel to first and second perpendicular axes, respectively, the method comprising calculating sample values for pixels of the image in accordance with first and second sampling rates, the sampling rate remaining constant for consecutive pixels arranged along any one given line parallel to the first axis and varying between the first and second sampling rates for consecutive pixels arranged along any one given line parallel to the second axis. As previously discussed with respect to claim 23, the Sato patent does not disclose using different sampling rates. The Sato patent discloses using different patterns for different pixels, but the different

patterns have the same number of samples per pixel. Consequently, the Sato patent does not disclose the sampling rate remaining constant for consecutive pixels arranged along any one given line parallel to the first axis and varying between the first and second sampling rates for consecutive pixels arranged along any one given line parallel to the second axis.

With respect to claim 41, the Sato patent fails to at least disclose a method for calculating values for pixels of an image having its pixels arranged in rows and columns parallel to first and second perpendicular axes, respectively, the method comprising calculating sample values for pixels of the image in accordance with one or more sampling patterns, the region of potential sampling locations relative to a pixel considered as divided evenly into a four-by-four array of sub-regions each sampling pattern having at least two sample locations relative to a pixel, each sample location located at one of four candidate sampling locations, and the candidate sampling locations arranged in a manner whereby no two of the four candidate sample locations for a given sampling pattern are located along the same row, column, or diagonal of sub-regions, at least one sampling pattern including at least one other sampling location not located in one of the candidate sampling locations, no more than seven sub-regions containing any sampling location. The Sato patent discloses different sampling patterns where four samples are taken per pixel, but fails to disclose at least one sampling pattern including at least one other sampling location not located in one of the candidate sampling locations, and no more than seven sub-regions containing any sampling location, as recited in claim 41.

Claim 42 is patentably distinct from the Sato patent because the Sato patent fails to at least disclose a method for calculating values for pixels of an image having its pixels arranged in rows and columns parallel to first and second perpendicular axes, respectively, the method comprising calculating sample values for pixels of the image in accordance with a sampling pattern, the region of potential sampling locations relative to a pixel considered as divided evenly into a four-by-four array of sub-regions, the sampling pattern having two sample locations relative to a pixel, each sample location located at one of four candidate sampling locations, and the candidate sampling locations arranged in a manner whereby no two of the four candidate sample locations for a given sampling pattern are located along the same row, column, or diagonal of sub-regions. As previously discussed with respect to claims 1 and 14, the Sato

patent discloses the use of sampling patterns where four or more samples are taken per pixel. In contrast, claim 42 recites a sampling pattern having two sample locations relative to a pixel.

With respect to claim 63, the Sato patent fails to at least disclose a method for calculating values for pixels of an image having pixels arranged in rows and columns parallel to first and second perpendicular axes, respectively, the method comprising calculating sample values for pixels of the image in accordance with a fixed set of sampling patterns stored in a read-only memory, the sampling pattern for a given pixel is determined by a calculation based upon the row and/or column containing the pixel. The Sato patent describes using a SRAM module 115 as the sample pattern storing unit. *See* col. 7, lines 50-55 and Figure 5. The term “SRAM” represents Static Random Access Memory. As known in the art, an SRAM device is not the same as a read-only memory (“ROM”) as recited in claim 63. For example, once programmed, a ROM memory, as also known in the art, cannot be accessed to store new data as in a SRAM device. A SRAM device can store data without the need to be reprogrammed. Consequently, the Sato patent fails to disclose using a read-only memory for storing a fixed set of sampling patterns, as recited in claim 63.

Similarly, claim 64 is patentably distinct from the Sato patent because the Sato patent fails to at least disclose a method for calculating values for pixels of an image having pixels arranged in rows and columns parallel to first and second perpendicular axes, respectively, the method comprising calculating sample values for pixels of the image in accordance with a fixed set of sampling patterns stored in a read-only memory. As previously discussed with respect to claim 63, the Sato patent uses a SRAM module 115 as the sample pattern storing unit, and not a read-only memory for storing sampling patterns, as recited in claim 64.

Claim 70 is patentably distinct from the Sato patent because the Sato patent fails to at least disclose a method for calculating values for pixels of an image having the pixels arranged in rows and columns parallel to first and second perpendicular axes, respectively, the method comprising shifting the sampling locations defined by one or more sampling patterns relative to a pixel. The Sato patent discloses the use of sample patterns where the sample positions per pixel are fixed, and do not shift. That is, the sample patterns disclosed in the Sato patent are applied to sampling a pixel without shifting the location of the samples. In contrast,

claim 70 recites shifting the sampling locations defined by one or more sampling patterns relative to a pixel.

Claim 86 is patentably distinct from the Sato patent because the Sato patent fails to at least disclose an apparatus for rendering an image having pixels arranged in rows and columns parallel to first and second perpendicular axes, respectively, the apparatus sampling at two sample locations relative to a pixel in accordance with a sampling pattern. As previously discussed with respect to claims 1, 14, and 42, the Sato patent discloses the use of sampling patterns where four or more samples are taken per pixel. In contrast, claim 86 recites an apparatus that samples at two sample locations relative to a pixel.

Claim 91 is patentably distinct from the Sato patent because the Sato patent fails to at least disclose an apparatus for rendering of an image having pixels arranged in rows and columns parallel to first and second perpendicular axes, respectively, the apparatus calculating sample values for pixels in accordance with first and second sampling rates, the sampling rate remaining constant for consecutive pixels arranged along any given line parallel to the first axis and the sampling rate varying between the first and second sampling rates for consecutive pixels arranged along any given line parallel to the second axis, the apparatus further calculating values for the pixels of the image from the respective sample values. As previously discussed with respect to claims 23 and 27, the Sato patent discloses using different sampling patterns for different pixels, however, each sampling pattern has four samples per pixel. That is, the sampling rate for the pixels are the same, which is four samples per pixel, although different sampling patterns are used.

For the foregoing reasons, claims 1, 14, 23, 27, 41, 42, 63, 64, 70, 86, and 91 are patentably distinct from the Sato patent. Claims 2-13, which depend from claim 1, claims 15-22, which depend from claim 14, claims 24-26, which depend from claim 23, claim 28, which depends from claim 27, claims 43-48, which depend from claim 42, claims 67-69, which depend from claim 64, claims 71, 76, 78, 80, 82, and 84, which depend from claim 70, and claim 88, which depends from claim 86, are similarly patentably distinct based on their dependency from a respective allowable base claim. That is, each of the dependent claims further narrows the scope of the claim from which it depends, and consequently, if a claim is dependent from an allowable

base claim, the dependent claim is also allowable. Therefore, the rejection of claims 1-28, 41-48, 63, 64, 67-71, 76, 78, 80, 82, 84, 86, 88, and 91 under 35 U.S.C. 102(e) should be withdrawn.

As previously mentioned, claims 29-32 have been rejected under 35 U.S.C. 103(a) as being unpatentable over the Sato patent in view of the Wong patent. The Wong patent has been cited by the Examiner as teaching “selecting a sampling pattern from a plurality of sampling patterns shown in figures 5A-5L, and based on the super-sample pattern utilized, the location of the sub-pixel associated with each super-sample is determined according to the pattern shown in figures 5A-5L.” *See* the Office Action at pages 35-36. Even if the Examiner’s characterization of the Wong patent is assumed to be accurate, the teachings do not make up for the deficiencies of the Sato patent previously mentioned. Consequently, the combined teachings of the Sato patent and the Wong patent fail to teach or suggest the combination of limitations recited by claims 29-32. Moreover, claims 29-32 depend from claim 27. As previously discussed, claim 27 is allowable over the art cited by the Examiner. Consequently, claims 29-32 are similarly allowable by virtue of the dependency from allowable base claim 27. Therefore, the rejection of claims 29-32 under 35 U.S.C. 103(a) should be withdrawn.

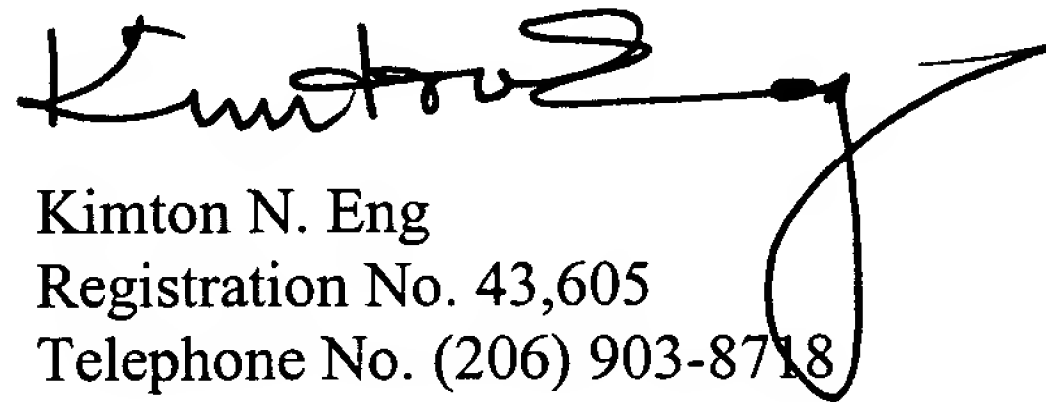
As previously mentioned, claims 57, 58, 65, 66, 72-75, 77, 79, 81, 83, and 85 were rejected under 35 U.S.C. 103(a) as being unpatentable over the Sato patent in view of the Mitchell reference. Claims 57 and 58 have been cancelled, and consequently, the rejection of those claims is now moot. With respect to claims 65, 66, 72-75, 77, 79, 81, 83, and 85, these claims are patentable because the combined teachings of the Sato patent and the Mitchell reference fail to teach or suggest the combination of limitations recited by the respective claims. That is, the Mitchell reference has been cited by the Examiner as teaching a “non-uniform or adaptive sampling patterns [sic] with variations in local sampling densities for super-sampling cells or pixel regions or pixels and the sampling pattern is randomly selected.” *See* the Office Action at page 37. Even if the Examiner’s characterization of the Mitchell reference is assumed to be accurate, the teachings do not make up for the deficiencies of the Sato patent previously mentioned. Moreover, claims 65 and 66, which depend from claim 64, and claims 72-75, 77, 79, 81, 83, and 85, which depend from claim 70. As previously discussed, claims 64 and 70 are allowable over the art cited by the Examiner. Consequently, claims 65, 66, 72-75, 77, 79, 81, 83, and 85 are similarly allowable by virtue of the dependency from respective allowable base

claims 64 and 70. Therefore, the rejection of claims 65, 66, 72-75, 77, 79, 81, 83, and 85 under 35 U.S.C. 103(a) should be withdrawn.

All of the claims pending in the present application are in condition for allowance. Favorable consideration and a timely Notice of Allowance are earnestly solicited.

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